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## SIRIUS fast beam orbit interlock system

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Insertion devices (IDs) are currently being installed at the SIRIUS storage ring to provide photon beams for upcoming high-brilliance beamlines. A fast orbit distortion detection system is imperative to safeguard critical vacuum chambers located near the straight sections of the IDs. In November 2023, an in-house Delta undulator was successfully installed, and a fast orbit interlock protection system has been in place, utilizing BPMs and the timing system's infrastructure. A dedicated position and angle calculation is implemented in FPGA and operates at a 6 kHz rate in the BPM processing electronics. A timing receiver board at the BPM uTCA crate acts as a bridge between orbit distortion detection and the timing system's event generator (EVG), which sends an interlock signal to the LLRF controller. The main purposes of this work are to provide details about a new full-duplex timing network implementation, to discuss the main requirements of the orbit interlock, and to present measured performance results. Additionally, in pursuit of enhancing system reliability, post-mortem analysis and ongoing implementation proposals will also be presented.

### Footnotes

### Funding Agency

### I have read and accept the Privacy Policy Statement

Yes

**Primary author:** Mr PERISSINOTTO, Lucas (Brazilian Synchrotron Light Laboratory)

**Co-authors:** Ms OLIVEIRA, Ana Clara de Souza (Brazilian Synchrotron Light Laboratory); Mr GIACHERO, Augusto Fraga (Brazilian Synchrotron Light Laboratory); TAVARES, Daniel de Oliveira (Brazilian Synchrotron Light Laboratory); CARDOSO, Fernando Henrique (Brazilian Synchrotron Light Laboratory); DE SÁ, Fernando Henrique (Brazilian Synchrotron Light Laboratory); Mr SARETTI, Gabriel de Goes (Brazilian Synchrotron Light Laboratory); Mr CRUZ, Guilherme Ricioli (Brazilian Synchrotron Light Laboratory); Mr BRITO, João Leandro Neto (Brazilian Synchrotron Light Laboratory); RUSSO, Lucas (Lawrence Berkeley National Laboratory); DONATTI, Mauricio (Brazilian Synchrotron Light Laboratory); Mr ROCHA, Thiago Mendes da (Brazilian Synchrotron Light Laboratory); Mr ROLIM, Érico Nogueira (Brazilian Nanotechnology National Laboratory)

**Presenter:** CARDOSO, Fernando Henrique (Brazilian Synchrotron Light Laboratory)

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